Cuadernos de Economía (2022) Volume 45, Issue 127, Page 120-129

Asociación Cuadernos de economía

Cuadernos de economía

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ARTÍCULO

Stock Market Responses to Covid-19 Pandemic and Monetary Policy in Indonesia: Pre and Post Vaccine

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Jel Codes:

C22, E43, E44, E52

Keywords: Covid-19; Monetary Policy; Stock Market, ARDL bound.

Abstract: This study seeks to determine how the Indonesian stock market reacts to COVID-19, monetary policy, and other macroeconomic variables. The data used is, therefore, from March 2020 to December 2021. First, using the ARDL bounds testing approach, the influence of COVID-19 on the stock market was analyzed before and after the public vaccination of the stock market. This study then explores the stock market's reaction to monetary policy changes. According to the findings of this analysis, Covid-19 had a significant impact on the Indonesian stock market before vaccination, but after vaccination, it had no significant effect on the Indonesian stock market. During the COVID-19 period, monetary policy substantially impacted the Indonesian stock market. This is the first study to assess the influence of COVID-19 on Indonesian stock market performance before and after immunization. The performance of the stock market improves after receiving the vaccine. This demonstrates that the vaccine was effective. In addition to considering tiny towns' health and economic elements, researchers urge that the government create additional measures. In addition, expansionary monetary policy must employ the concept of prudence so as not to precipitate another crisis.

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https://doi.org/10.32826/cude.v1i127.610

1. Introduction

The new variant of the coronavirus known as COVID-19 is an infectious disease that causesfever, weakness, coughing, seizures, and diarrhea Repici et al. (2020). In early December 2019, the city of Wuhan, China, was the first to detect COVID-19 Yang et al. (2020). Since March 2020, more than 113,000 cases have been confirmed Tulloch, Roldan de Jong, and Bardosh (2021). The infectious disease has spread almost all over the world. Covid-19 spread and was detected in Indonesia in early March 2020, becoming one of the countries with the 14th highest rate of Covid-19 cases, namely until December 2021, with more than 4,000,000 confirmed cases Galloway et al. (2021). COVID-19 has significantly changed the order of life in various aspects of life, especially in the world economy. Because of COVID-19, the world is experiencing the most significant recession in the previous 50 years of global economic history, as evidenced by the worldwide economy's minus 3.5 percent growth in 2020 Muhyiddin and Nugroho (2021). The Indonesian economy experienced relatively similar results in line with the global economy. Following a positive 3% growth rate in the first quarter of 2020, the economy fell into a rapid decline for the next three quarters, falling by a negative 5.3 percent, minus 3.5 percent, and minus 2.2 percent Muhyiddin and Nugroho (2021). The impact on financial markets was no less dramatic. The breaker has only been tripped once since it was established in 1987, in 1997.

Along with the US stock market meltdown, stock markets in Europe and Asia also plummeted. On March 12, 2020, Britain's primary index, the FTSE, plummeted more than 10%, its worst day since 1987. Japan's stock marketis fallen more than 20% from its December 2019 highs Zhang, Hu, and Ji (2020). Similar conditions also occurred in the Indonesian stock market; the composite stock price index weakened. On April 08, 2020, the joint-stock price index declined by 64.06 points, or 1.34%, to 4,714.58 Machmuddah, Utomo, Suhartono, Ali, and Ali Ghulam (2020). The government and Bank Indonesia's responseto Covid-19 are as follows: the government allocates IDR 1.035 trillion. On the monetary side,the Central Bank carried out quantitative easing by reducing the Statutory Reserves limit by IDR 170 trillion and purchasing instruments on the secondary market by IDR 330 trillion.

Earlier studies analyzed the effect of COVID-19 on the stock market Al-Awadhi, Alsaifi, Al-Awadhi, and Alhammadi (2020); Anh and Gan (2020); Chaouachi and Slim (2020); Chopra and Mehta (2022); Gherghina, Armeanu, and Joldeș (2020); Hatmanu and Cautisanu (2021); Z. Liu, Huynh, and Dai (2021); Sahoo (2021); Singh and Shaik (2021). This study focuses on developing nations and industrialized nations like the United States (Vietnam, Italy, China, and America). Indonesian researchers have also investigated the impact of COVID-19 on stock market performance Utomo and Hanggraini (2021). Due to a lack of preceding studies, nobody has explored the effects of the Covid-19 vaccination on the Indonesian stock market. No study has compared the impact of Covid-19 on the stock market before and after its introduction. In addition, early research in Indonesia has not quantified the importance of monetary policy in mitigating the effects of COVID-19 on the Indonesian economy.

2. Literature Review

COVID-19's spread, and repercussions are being felt in numerous world regions. The COVID-19 epidemic's economic impact, changes in the productive workforce Amar and Pratama (2020); Svabova and Gabrikova (2021), changes in international trade between countries Megits, Neskorodieva, and Schuster (2020); Utami, Sumaji, Susanto, Septina, and Pratama (2019), and the stock market are predictable. At the start of Covid-19, Anh and Gan (2020) found that the increase in Covid-19 had a negative response from the stock market. This indicates that the global stock market was unstable during the Covid-19 pandemic. This suggests that Covid-19 is detrimental to the global financial stock markets, although the impact varies depending on whether the country is developing or not Nu'man, Nurwandi, Bachtiar, Aspiranti, and Pratama (2020); Singh and Shaik (2021). Already many researchers have found that COVID-19 has a significant influence on the stock market. Alber (2020) conducted research in 6 countries, and the results showed that new cases of Covid-19 affected the stock market more in China, France, Germany, and Spain during the period March 01, 2020, to April 10, 2020. Nugroho, Christiananta, Wulani, and Pratama (2020); Rahman, Rahman, and Abedin (2020) tested the effect of macroeconomic variables during Covid-19 in USA and Canada using the Pooled Ordinary Least Square (Pooled OLS) method, and the results show that in new cases, Covid-19 reduces the adverse reaction of stock market returns, interest rate has no significant effect over the period study. Other research, such as Sahoo (2021), stated a substantial difference in the stock market before the Covid-19 outbreak from the conditions at the beginning of the Covid-19 situation.

According to research conducted by Okorie and Lin (2021), the transmission of covid-19 affected the stock market in the short term, but this effect would diminish over the medium and long time. This finding contradicts Gherghina et al. (2020) conclusion that Covid-19 has no short- or long-term influence on the stock market. At the same time, fiscal stimulus is urgently required to counteract the detrimental effects of COVID-19 on health and the economy.

Reduced government revenues have constrained the available fiscal space. Bank Indonesia, as the monetary authority, assists the government in overcoming the restricted fiscal space through unconventional economic policies, as it is well-known that monetary policy has a variety of instruments that can be utilized to influence the economy Tanjung, Afifuddin, Daulay, and Ruslan (2017); Tanjung, Daulay, Irsad, and Ruslan (2019). Feldkircher, Huber, and Pfarrhofer (2021)measured the effectiveness of the COVID-19 recession monetary policy in the United States using mixed frequency vector autoregressive (MF-VAR); the results indicated that expansionary monetary policy during the Covid-19 recession was able to increase the growth and return of the stock market.

Baker, Farrokhnia, Meyer, Pagel, and Yannelis (2020) investigate the volatility of the US stock market crisis using a text-based method and daily stock market data from 1985, 1900, etc. Due to government restrictions on dispersion, no earlier disaster has affected the stock market as severely as the Covid epidemic. Social connection and commercial activity, which have enormous effects in a service-based economy, are the primary reasons the US stock market reacted so much more strongly to the COVID-19 epidemic than to earlier pandemics in 1918–1919 1957–1968, and 1968. In addition, the previous crisis left just a faint impression on the volatility of the US stock market. Olivia, Gibson, and Nasrudin (2020) explore the effect of volatility on Indonesia's health and economic crisis and the government's response to it. Researchers indicate that, at the time of writing this report, the government's response to the health and economic crises does not look promising; they cannot handle the situation, and therefore it continues to deteriorate. The Indonesian government determined that a reduction in the policy rate could have prompted investors to shift their assets back into nations with safe-haven currencies, causing instability in the rupiah.

H. Liu, Manzoor, Wang, Zhang, and Manzoor (2020) examine the coronavirus outbreak on 21 leading stock market indices in major affected countries such as Japan, Korea, Singapore, the USA, Germany, Italy, the UK, etc. The Covid 19 epidemic had

an essential effect on the stock market. Using the event study method, the researcher indicates that markets in major affected countries and areas fell quickly after the virus outbreak, but in the case of Asia countries, there is more loss than in other regions of the world. The findings of the fixed-effect model also indicate the adverse effect of COVID-19 confirmed cases on stock indices' abnormal returns through an effective channel by adding up investors' pessimistic sentiment on future returns and fears of uncertainties. Sun and Hou (2019) found that Malaysia, Vietnam, and Thailand were the most financially integrated with China in Southeast Asia. Nippani and Washer (2004) examined the effect of SARS on Canada, China, and the particular administrative region of Hong Kong, Indonesia, China, Singapore, the Philippines, Vietnam, and Thailand, studying the comparison between SARC and Non-SARS countries. Researchers concluded that SARS only affected the stock markets of China and Vietnam. According to Morales and Andreosso-O'Callaghan (2012), the global stock markets were becoming more interdependent and crisis in one country would soon spread to another. Stock market movements become increasingly correlated.

Asma'Munifatussa'idah (2020) examines Indonesia's monetary policy during the COVID-19 outbreak from an Islamic perspective. Banks plan a policy to support the risk mitigation efforts of the spread of COVID-19, maintain market stability and financial system, and encourage economic growth. The ultra-accommodative monetary policy adopted by various countries to mitigate the impact of COVID-19. Central banks in multiple countries have eased policy and liquidity interest rates. The Federal Reserves (The Fed) and the Bank of Canada have reduced policy rates to 150 bps since 2019. Most developed and developing countries have also lowered interest rates to control the country's inflation rate. Similarly, Indonesia has lowered the BI 7-Days Reverse Repo Rate (BI7DRR) policy by issuing policies dealing with the COVID-19 outbreak based on the Bank Indonesia Board of Governors Meeting Asma'Munifatussa'idah (2020). Vierlboeck and Nilchiani (2021) conducted a case study to investigate the development effect of the Covid-19 vaccine on the stock market. Results show that after the vaccine, stock prices show a positive association. In the case of Asia Rizvi, Juhro, and Narayan (2021) study the stock market reaction to the monetary and fiscal policy during the Covid-10 pandemic. Except for Malaysia, the data indicate that fiscal policies helped cushion financial market losses in all nations seven days after policy announcements. Moreover, the 7-day response implies that fiscal policy is more effective in Malaysia and Singapore than monetary policy is in Indonesia and Thailand. Rouatbi, Demir, Kizys, and Zaremba (2021) examine the correlation between stock market volatility and vaccines throughout the pandemic era. Researchers collected daily data from 66 nations, including 22 developed countries and 44 emerging countries, between January 1, 2020, and April 30, 2021. The results suggest that COVID-19 vaccination helps stabilize global equities markets. Moreover, immunizations have a more significant influence on industrialized markets than emerging economies.

Due to a lack of preceding studies, nobody has explored the impact of the Covid-19 vaccination on the Indonesian stock market. No study has compared the effects of Covid-19 on the stock market before and after its introduction. In addition, early research in Indonesia has not quantified the importance of monetary policy in mitigating the effects of COVID-19 on the Indonesian economy.

3. Methodology

The research aims to examine the stock market's responses to the COVID-19 outbreak and monetary policy in Indonesia pre and post-vaccine. To conduct this research, the kind of data used is secondary data; weekly data was obtained over 96 weeks, beginning on March 02, 2020, peculiarly, When the Indonesian government first confirmed Covid-19, until December 31, 2021. To measure the response stock market to Covid-19, we considered the IHSG index, the composite stock price index, and a reference index for the stock market in Indonesia.

The conducted analysis takes into account two events that occurred during the research period: the Covid-19 pandemic before vaccination, beginning on March 2, 2020, and ending on December 31, 2021, and the Covid-19 pandemic after vaccination for the Indonesian population, starting on January 2, 2021, and ending on December 31, 2021.

The dependent variable is the Composite Stock Price Index (IHSG), whereas the independent variables are variables directly associated with COVID-19, variables related to monetary policy instruments, and the world economy. The variable descriptions are listed in Table 1.

Table 1. Variable descriptions

Variables	Description	Source
IHSG	The composite stock price index covers the pricemovements of all primary and preferred stocks listed on the IDX.	https://finance.yahoo.com/quote/%5EJKSE/
NEC	The number of new confirmed COVID-19 cases in Indonesia	https://ourworldindata.org/covid-cases
BI7DRR	The reference interest rate or the new policy rate, namely the BI-7 Day Reverse Repo Rate, indicates the monetary attitude or attitude decided by Bank Indonesia and discloses to the public.	The Central Bank of theRepublic of Indonesia
PMI_n	It is purchasing Managers' Index (PMI), where 'n' is the area or nation represented in the research, such as the USA for the United States of America (PMI USA) or JPG for Japan (PMI	tradingeconomics.com
	JPG). The PMI is a gauge of the manufacturingand service sectors' economic health. It is used as a proxy for overall financial/business activity.	
US_rate	The foreign interest rate, in this case, is the Federal Funds Effective Rate FED.	https://fred.stlouisfed.org/series/FEDFUNDS

Sources are indicated in the table

The stages conducted in this research are: examining descriptive statistics, checking for unit root, determining the kinds of relations among variables, modeling the relationships between variables, and acknowledging model robustness.

Data analysis by following the Auto Regressive Distributional Lag (ARDL) cointegration developed by Pesaran and Shin (1995); Pesaran, Shin, and Smith (2001) was applied in this research. This model was adopted from the model of Erokhin and Gao (2020); Gherghina et al. (2020); Hatmanu and Cautisanu (2021). Equation (1) describes the relationship between the IHSG variable as a stock market variable and other independent variables in the ARDL Bound test model.

$$\Delta IHSG_t = \delta_0 + \sum_{i=1}^{n} \delta_{1i}\Delta IHSG_{t-i} + \sum_{i=1}^{n} \delta_{2i}\Delta BI7DRR_{t-i} + \sum_{i=1}^{n} \delta_{3i}\Delta NeC_{t-i} + \sum_{i=1}^{n} \delta_{4i}\Delta PMI\_JPG_{t-i} + \sum_{i=1}^{n} \delta_{5i}\Delta PMI\_US_{t-i} + \sum^{i=1} \delta_{6i}\Delta US\_rate_{t-i} + \rho ECT_{t-1} + {}_{-i} \quad (1)$$

where Δ = first difference operator; δ_0 = constant term; δ_1, δ_2, δ_3, δ_4, δ_5 and δ_6 = variable's short-run coefficient; *i* = Order of ARDL model lag; = t = time; ρECT_{t-1} = term of error correction; ε_{t-i} = errors disturbance.

4. Results And Discussion

At this stage, a descriptive analysis is carried out related to the coefficient of variation. The coefficient of variation, expressed as a percentage of the standard deviation and the mean, has been utilized to examine the degree of variability and representativeness of the implications for the studied series. According to the results, the variation value IHSG index was 11.65 percent, indicating that the mean is indicative of these data. Concerning the Purchasing Managers' Index, the lowest variation was in Japan, PMI_JPG = 9.35 percent, and in the USA, PMI_USA=12.48 percent. The highest degree of variation was found for foreign interest rate, US_rate =151.78 percent. Table 2 summarizes the descriptive statistics for the variables.

Table 2. Variables' descriptive statistics

Variable	Mean	Medi	Mini	Maxi	STD	Skew.	Kurt.	JarqueBera	Prob.
IHSG	5707.057	5973.798	6697.424	4194.944	664.699	-0.404	1.922	7.256	0.027
BI7DRR	3.802	3.750	4.500	3.500	0.364	0.864	2.353	13.631	0.001
NEC	44403.330	27537.500	341749.000	4.000	65352.110	2.754	10.691	357.993	0.000
PMI_JPG	49.243	50.000	54.500	38.400	4.603	-0.975	2.932	15.225	0.000
PMI_US	55.418	58.050	63.400	36.100	6.915	-1.380	4.278	37.012	0.000
US_RATE	0.106	0.080	1.257	0.046	0.160	6.443	43.898	7354.658	0.000

Source: Authors' finding

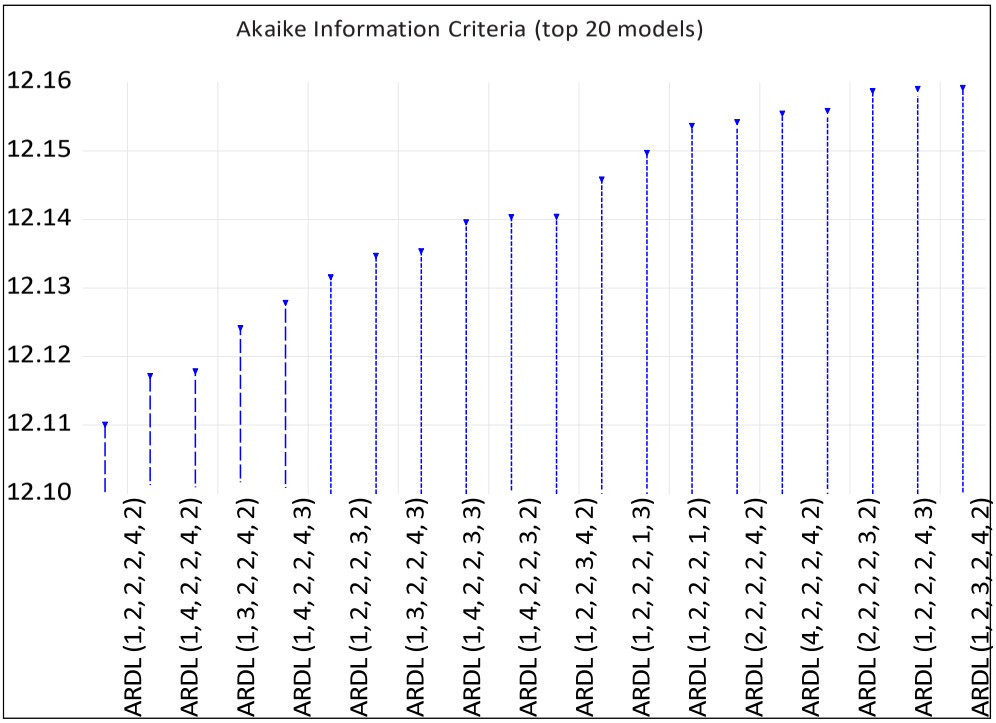
Domestic variables distribution, such as interest rate, the number of new cases, and foreign interest rate, show a positive asymmetry. Variables distribution such as IHSG, Distributing, and Purchasing Managers' Index for USA and Japan, show a negative asymmetry. This indicates that the COVID-19 shock to manufacturing sector activities was low-intensity and short-run. The variable must be tested for stationarity within the realm of time series analysis before conducting the causality test. This purpose can be achieved by applying the stationarity test to the datain this study using the ADF test; the results are shown in Table 3. Results of the stationary test show that variables NEC, ND, PMI_US, and US_Rate are stationary at level. Whereas variables IHSG, BI7DRR, PMI_CHINA, and PMI_JPG are stationary at First Difference.

Table 3. Stationary Test Result

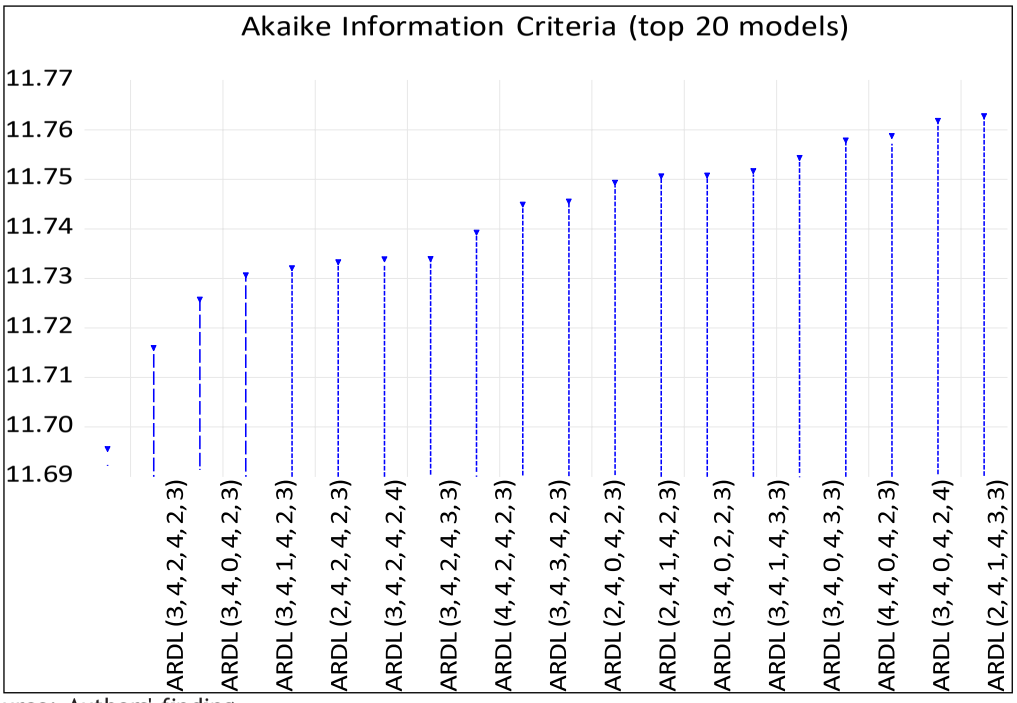
Variable	Unit root	Prob. ADF test	Decision
IHSG	Level	0.8629**	Non- Stationary
	1st Difference	0.0000**	Stationary
BI7DRR	Level	0.0274**	Stationary
NEC	Level	0.0094**	Stationary
PMI_JPG	Level	0.9227**	Non- Stationary
	1st difference	0.0000*	Stationary
PMI_US	Level	0.9438**	Stationary
US_RATE	Level	0.0000**	Stationary

*Model without constant and trend, **model without trend
Source: Authors' finding

The results of the stationarity test indicate that the level and first difference of the data are stationary. Consequently, the Auto Regressive Distributed Lagged (ARDL) model is appropriate for this study. In addition, selection of Automatic Lag Optimum utilizing AIC criteria for the ARDL model. Figure 1 demonstrates that the optimum ARDL model for pre-vaccination is the model (1,2,2,4,2) with the minimum AIC value. Similarly, the optimal ARDL model for post-vaccination is (3,4,2,4, 2, 3), as illustrated in Figure 2. The cointegration ARDL bound test is shown in Table 4 and 5. The results of this limits test compare the F-statistic to the critical value at the 5% confidence level. The null hypothesis, which asserts that there is no long-term relationship, is rejected if the F-statistic exceeds the upper limit, showing that the variables in this study move together over time. Within the pre-vaccination model (see table 4), the F-statistic is 4,786,183, which is greater than the upper limits value, indicating a long-run link between the variables. The same conclusion is reached in post-vaccination models with an F-statistic value greater than the upper bound critical value with F-statistic = 8.223244. Thus, the null hypothesis is rejected, confirming that the model's variables are cointegrated. The results reveal that cointegration relationships occur among the variables in all models at a significant level of at least 1%. We use the ARDL models inside an error correction model (ECM) approach to validate the long-run relationships. To verify its models, we checked the stability of coefficients (figure 3). Criteria check CUSUM, particularly: (1) if the CUSUM line is at a critical value of 5% or does not come out of the upper and lower bounds, then the estimate is considered stable, and (2) if the CUSUM line comes out of the upper and lower bounds, then estimate is considered not stable.



Source: Authors' finding Figure 1. Optimal lags for the model ARDL for pra vaccine



Source: Authors' finding
Figure 2. Optimal lags for the model ARDL for post-vaccine

Table 4. The ARDL bounds test results for the model pre-vaccine.

Model	ARDL-lag max	F-statistic value
02 – March-2020-31-December-2020		
Pre vaccine (IHSG |BI7DRR, NEC, PMI_JPG, PMI_USA, US_RATE)	(1,2,2,2,4,2)	4.786183
Critical Value Bounds		
Significance	I (0)	I (1)
10%	1.81	2.93
5%	2.14	3.34
2.5%	2.44	3.71
1%	2.82	4.21

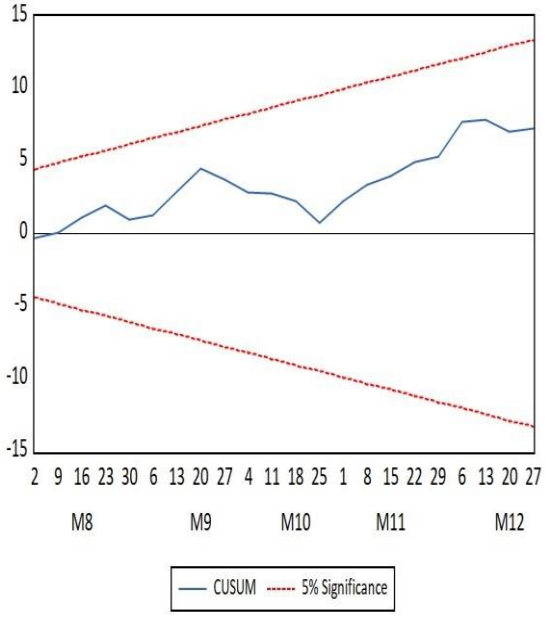
Source: Authors' finding

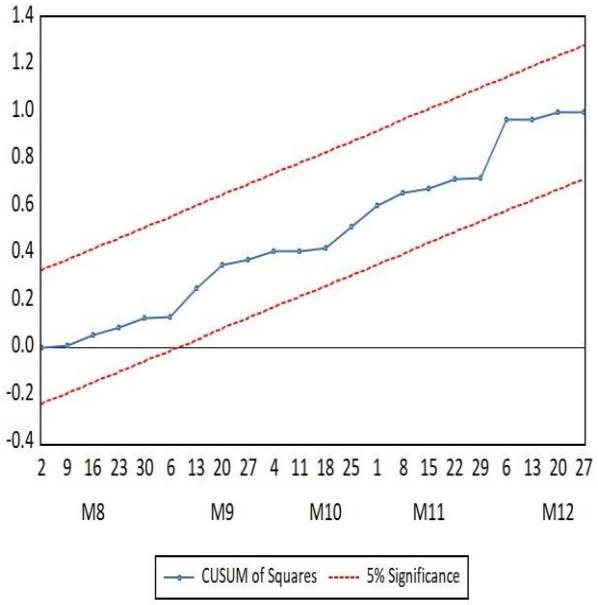
Table 5. The ARDL bounds test results for the model post-vaccine.

Model	ARDL-lag max	F-statistic value
01 – January-2021-31-December-2021		
Pre vaccine (IHSG |BI7DRR, NEC,		Pre vaccine (IHSG |BI7DRR, NEC,
Critical Value Bounds		
Significance	I (0)	I (1)
10%	2.75	3.79
5%	3.12	4.25
2.5%	3.49	4.67
1%	3.93	5.23

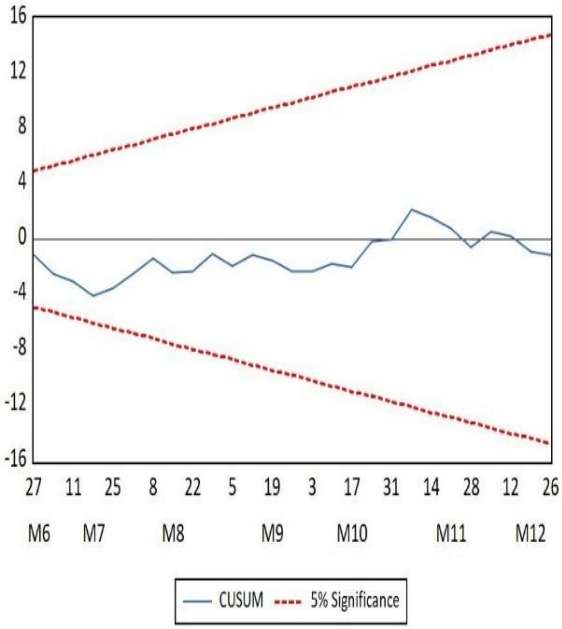
Source: Authors' finding

Pre vaccinePeriod





Post vaccinePeriod



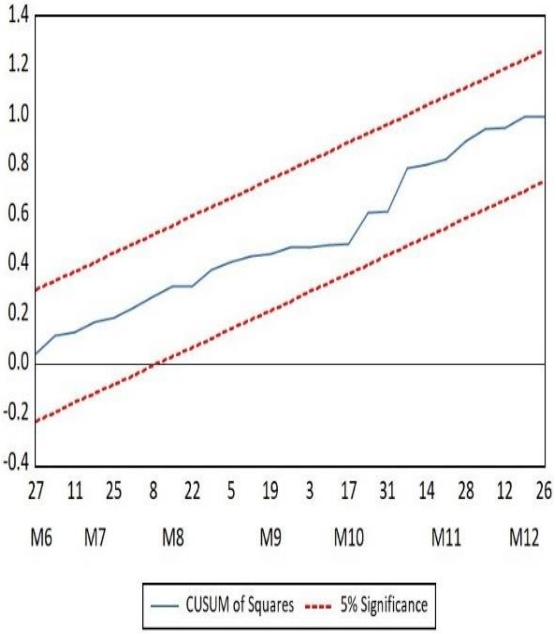


Figure 3 illustrates the charts of the CUSUM and CUSUMQ tests for parameterstability.

Results test CUSUM and CUSUMQ show that the estimate ARDL Models ((1,2,2,2,4,2) and (3,4,2,4,2,3) have stability so that the estimation results can be used to interpret the relationship between domestic interest rates (BI7DRR), New Cases Covid-19 (NC), USA Purchasing Managers' Index (PMI_USA), Japan Purchasing Managers' Index (PMI_JPG), foreigner Interest Rate (USA_rate) on Stock Market in Indonesia.

Table 6. Result Long-Run ARDL

Pre-Vaccine				
IHSG				
Variables	Coefficient	Std. error	t-Statistic	Prob.
BI7DRR	-5518.579	12353.43	-0.44673	0.6594
NC	-0.294305	0.601291	-0.48946	0.6294
US_RATE	-456497.4	894636.4	-0.51026	0.6150
PMI_USA	1704.608	3153.972	0.540464	0.5943
PMI_JPG	-280.4824	681.08	-0.41182	0.6845
Post Vaccine				
IHSG				
BI7DRR	1042.113	439.5682	2.370765	0.0251
NC	0.001131	0.00074	1.527773	0.1382
US_RATE	-233.0783	4643.356	-0.0502	0.9603
PMI_USA	-102.8166	26.5997	-3.86533	0.0006
PMI_JPG	32.47492	28.51353	1.138930	0.2647

Table 7. ARDL short-run coefficients estimates for the ARDL model

Pre vaccine				
D(IHSG)				
Variables	Coefficient	Std. error	t-Statistic	Prob.
D (BI7DRR)	874.3494	306.2449	2.855066	0.0092
D (BI7DRR (-1))	540.8912	271.5339	1.991984	0.0589
D (NC)	-0.031841	0.008745	-3.640915	0.0014
D (NC (-1))	-0.03117	0.007096	-4.392457	0.0002
D (US_RATE)	-1854.055	3778.774	-0.49065	0.6285
D (US_RATE (-1))	-2943.841	1000.757	-2.941614	0.0075
D (PMI_USA)	34.77959	9.371924	3.71104	0.0012
D (PMI_USA (-1))	-16.83336	6.261611	-2.688343	0.0134
D (PMI_USA (-2))	-6.110591	5.542438	-1.10251	0.2822
D (PMI_USA (-3))	-20.18658	5.755252	-3.507506	0.002
D (PMI_JPG)	40.86995	14.15973	2.886351	0.0086
D (PMI_JPG (-1))	41.49402	13.83827	2.998498	0.0066
CointEq (-1) *	-0.0492	0.008288	-5.936642	0.0000
Post vaccine				
D(IHSG)				
C	5564.737	734.5239	7.575978	0.0000
@TREND	9.1901	1.348733	6.813876	0.0000
D (IHSG (-1))	0.479063	0.115868	4.134552	0.0003
D (IHSG (-2))	0.206306	0.117673	1.753218	0.0909
D (BI7DRR)	232.0165	340.0091	0.682383	0.5008
D (BI7DRR (-1))	-78.56219	338.4774	-0.232105	0.8182
D (BI7DRR (-2))	-280.2828	310.0467	-0.904002	0.374
D (BI7DRR (-3))	-1011.226	292.3583	-3.458859	0.0018
D (NC)	0.002086	0.000705	2.959377	0.0063
D (NC (-1))	-0.00086	0.000478	-1.798375	0.0833
D (US_RATE)	7358.405	2346.629	3.135735	0.0041
D (US_RATE (-1))	-7150.073	2778.084	-2.573743	0.0159
D (US_RATE (-2))	4793.746	2833.125	1.692035	0.1022
D (US_RATE (-3))	-11969.44	3512.899	-3.407283	0.0021
D (PMI_USA)	-22.70201	19.01966	-1.193608	0.243
D (PMI_USA (-1))	60.8824	21.39256	2.845962	0.0084
D (PMI_JPG)	86.49302	21.88645	3.951898	0.0005
D (PMI_JPG (-1))	41.99605	21.57178	1.946806	0.062
D (PMI_JPG (-2))	65.58033	20.91323	3.13583	0.0041
CointEq (-1) *	-0.895581	0.117116	-7.646987	0.0000

Source: Authors' finding

Table 8. The serial correlation LM test devised by Breusch and Godfrey

The serial correlation LM test devised by Breusch and Godfrey:			
Pre vaccine			
IHSG			
F-statistic	0.768269	Prob. F (2.20)	0.4770
Obs*R-squared	2.853825	Prob. Chi-Square (2)	0.2400
Post vaccine			
IHSG			
F-statistic	0.350121	Prob. F (2.25)	0.7080
Obs*R-squared	1.416819	Prob. Chi-Square (2)	0.4924

Source: Authors' finding

Table 8 shows the pre-vaccine Obs*R-squared probability value of 2.853825, which indicates a prob value greater than 0.05, which means that the model does not have autocorrelation. The Post vaccine situation is the same as pre-vaccine, where an Obs*R-squared probability value of 1.416819 indicates a prob value greater than 0.05, which means that the model does not have autocorrelation.

Table 9. Heteroscedasticity test of Breusch–Pagan–Godfrey

Heteroscedasticity test of Breusch-Pagan-Godfrey			
Pre vaccine			
IHSG			
F-statistic	0.457528	Prob. F (18.21)	0.9506
Obs*R-squared	11.26781	Prob. Chi-Square (18)	0.8826
Post vaccine			
IHSG			
F-statistic	0.63147	Prob. F (24.27)	0.8707
Obs*R-squared	18.69456	Prob. Chi-Square (24)	0.7681

Source: Authors' finding

Table 9. shows the probability value of Obs*R-squared in the pre-vaccine of 11.26781, which offers a prob value greater than 0.05, which means that the model does not have symptoms of heteroscedasticity. Likewise, in the Post vaccine, the probability value of Obs*R-squared in the post-vaccine is 018.69456, which indicates a prob value greater than 0.05, which means that this model is also not related to the symptoms of heteroscedasticity.

For the pre-vaccine period, in the long term, the interest rate variable (BI7DRR), New Cases (NEC), foreign interest rates (US_rate), and the level of economic activity of trading partners (PMI_USA, PMI_JPG) do not have a significant effect on the stock market in Indonesia. In the short term, new cases (NEC) responded negatively and significantly by the stock market, meaning that when there is an increase in New instances, the index in the stock market will decrease, and vice versa. These findings align with the research results of Kartal, Depren, and Depren (2021), which state that new cases have a very significant negative impact on the stock exchange in East Asian countries. The interest rate (BI7DRR) has a positive but not significant effect on the stockmarket, and this result is in line with the research results of Troeger et al. (2018), which state that the interest rate has an insignificant relationship to the stock market. This is because monetary policy transmission through interest rates requires a time lag to affect economic activity. First is the time interval from the emergence of financial problems to the emergence of policy actions to overcome them. Second is the time lag between when policy measures are implemented and when they impact the economy. The foreign interest rate (US_rate) has a negative but not significant effect on the stock market. The economic condition of America's trading partners (PMI_USA) has a negative and significant influence on the stock market in

Indonesia, while the economy of Japan's trading partners (PMI_JPG) has a positive and considerable impact on the stock market variable in Indonesia.

In the post-vaccine period, the new cases (NEC) variable was responded to positively but not significantly by the stock market in the long term. This means that the national vaccine implementation process has caused the number of new cases spread of Covid-19 to decrease so that even though there are new cases, it has no significant impact on the performance of the stock market in Indonesia. The Monetary policy Interest rate (BI7DRR) responded positively and significantly to the Indonesian stock market, and this finding is similar to the findings of Feldkircher et al. (2021). Various central banks globally, including Bank Indonesia, have played a significant role during limited fiscal space to accelerate economic recovery due to the COVID-19 pandemic through non-conventional policies or quantitative easing (QE), namely by buying government bonds or long-term financial assets. Another length of the open market. The purchase of these bonds will increase liquidity in the market, encourage improved credit and investment growth, and reduce the cost of money. Banks can provide loans at lower prices with lower interest rates, expected to revive the real sector. Changes in foreign interest rates (US_rate) responded negatively but not significantly by the stock market. Changes in America's trading partners (PMI_USA) responded negatively and considerably to the stock market in Indonesia. Changes in Japan's trading partners (PMI_JPG) responded positively and were not signed by the stock market. In the short term, changes in new cases (NEC) were responded to positively and significantly by the stock market. Changes in the stock market value of the previous period (D (JCI (-1)) had a positive and significant effect on the stock market, meaning that stock market players still tend to be backward-looking compared than be forward-looking. Interest rate changes (BI7DRR) responded positively and were not signed by the stock market. Changes in foreign interest rates (US_rate) responded positively and significantly to the stock market in Indonesia. Changes in the economic conditions of America's trading partners (PMI_USA) responded negatively but not significantlyby the stock market in Indonesia. Changes in the economic conditions of Japan's trading partners (PMI_JPG) responded positively and considerably to the Indonesian stock market. This change in partner economic conditions occurred after partner countries also carried out a vaccination process, so Indonesia's stock market response also varied depending on the economic recovery of partner countries.

5. Conclusion And Recommendation

This study focuses on the Covid-19 impact model, the interest rate as monetary policy, and the other stock market macroeconomic variables. In Indonesia, the pre-vaccine period runs from March 2020 to December 2020, and the post-vaccine period runs from January 2021 to December 2021. Utilizing the ARDL Bound Test Approach to examine data. The results of the ARDL Bound test indicate a long-run link between the stock market variables and other examined variables. In the period preceding the adoption of the national vaccine in Indonesia, New Cases (NEC) had an extraordinarily unfavorable impact on the Indonesian stock market, as determined by empirical analysis.

In contrast, New Cases (NEC) had a negligible impact on the Indonesian stock market after the vaccination process. Bank Indonesia's highly expansive monetary policy helps bolster a fiscal policy with limited room to aid economic recovery because of COVID-19. However, its implementation is delayed, beginning with Bank Indonesia's response to COVID-19 and monetary policy. It affects the economy. Domestic, international, and stock market economic interactions are vital, as evidenced by the Purchasing Managers' Index of partner nations' economic activities (PMI). It is possible to deduce that changes in the Indonesian stock market are influenced by concurrent changes in the domestic and global economies as trading partners.

According to the primary data, the installation of the vaccination has a significant economic impact, not only in Indonesia but also in other countries that also implement it. In light of the extreme unpredictability of the situation, this implies that the government must be able to control New Cases by administering mass vaccinations, restricting people's movement, imposing quarantine, and regularly reviewing every policy enacted. In addition to examining small towns' health and economic elements, the government may also design other measures. The established expansionary monetary policy must also adhere to the principle of prudence so as not to provoke another crisis.

This study has a drawback in that it primarily examines factors in the financial sector, excluding employment and economic growth, which demonstrate the impact of COVID-19 on the Indonesian economy. This is because there are insufficient data. There are some proposals for the next researcher: study the influence of stringent mobility restrictions and government-issued stimulus on Indonesia's economic recovery, and add ASIA and European countries so that comparisons may be made during the national economic recovery process.

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